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Stainless Steels - Stainless 304 Properties, Fabrication and Applications, Supplier Data by



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Background

Stainless steel types 1.4301 and 1.4307 are also known as grades the most versatile and widely used **stainless steel**. It is still some which is derived from the nominal composition of type 304 being

304 Stainless Steel

Stainless steel 304 is an austenitic grade that can be severely de 304 being the dominant grade used in applications like sinks and

304L Stainless Steel

Type 304L is the low carbon version of **Stainless steel 304**. It is u improved weldability. Some products such as plate and pipe may that meets the criteria for both 304 and 304L.

304H Stainless Steel

304H, a high carbon content variant, is also available for use at h

Property data given in this document is typical for flat rolled prod ASTM, EN or other standards may cover products sold by **Aalco**. I these standards to be similar but not necessarily identical to thos

Chemical Composition of Stainless Steel 304

Table 1. Typical chemical composition for 304

%	304	
C	0-0.07	(
Mn	0-2.0	
Si	0-1	
P	0-0.05	(
S	0-0.02	(
Cr	17.5-19.5	17
Ni	8-10.5	8
Fe	Balance	B

Properties of Stainless Steel 304

Mechanical Properties of Stainless Steel 304

Table 2. Typical mechanical properties for 304

Grade	304	304L	304H
Tensile Strength (MPa)	520-720	500-6070	520-720
Compression Strength (MPa)	210	-	-
Proof Stress 0.2% (MPa)	210	200	210
Elongation A5 (%)	45 Min	45 Min	40 Min
Hardness Rockwell B	92	-	-

Physical Properties of Stainless Steel 304

Table 3. Typical physical properties for 304 stainless steel alloys

Property	Value
Density	8.00 g/cm ³
Melting Point	1450°C
Modulus of Elasticity	193 GPa
Electrical Resistivity	0.072x10 ⁻⁶ Ω.m
Thermal Conductivity	16.2 W/m.K
Thermal Expansion	17.2x10 ⁻⁶ /K

Alloy Designations

[Stainless steel 304](#) also corresponds to the following standard designations and specifications:

Euronorm	UNS	BS	En	Grade
1.4301	S30400	304S15	58E	304
		304S16		
		304S31		
1.4306	S30403	304S11	-	304L
1.4307	-	304S11	-	304L
1.4311	-	304S11	-	304L

1.4948

S30409

304S51

-

304H

Corrosion Resistance of Stainless Steel 304

[Stainless steel 304](#) has excellent corrosion resistance in a wide variety of environments and when in contact with different corrosive media. Pitting and crevice corrosion can occur in environments containing chlorides. Stress corrosion cracking can occur at temperatures over 60°C.

Heat Resistance of Stainless Steel 304

[Stainless steel 304](#) has good resistance to oxidation in intermittent service up to 870°C and in continuous service to 925°C. However, continuous use at 425-860°C is not recommended if corrosion resistance in water is required. In this instance 304L is recommended due to its resistance to carbide precipitation.

Where high strength is required at temperatures above 500°C and up to 800°C, grade 304H is recommended. This material will retain aqueous corrosion resistance.

Fabrication of Stainless Steel 304

Fabrication of all [stainless steels](#) should be done only with tools dedicated to stainless steel materials. Tooling and work surfaces must be thoroughly cleaned before use. These precautions are necessary to avoid cross contamination of [stainless steel](#) by easily corroded metals that may discolour the surface of the fabricated product.

Cold Working of Stainless Steel 304

[Stainless steel 304](#) readily work hardens. Fabrication methods involving cold working may require an intermediate annealing stage to alleviate work hardening and avoid tearing or cracking. At the completion of fabrication a full annealing operation should be employed to reduce internal stresses and optimise corrosion resistance.

Hot Working of Stainless Steel 304

Fabrication methods, like forging, that involve hot working should occur after uniform heating to 1149-1260°C. The fabricated components should then be rapidly cooled to ensure maximum corrosion resistance.

Heat Treatment of Stainless Steel 304

[Stainless steel 304](#) cannot be hardened by heat treatment.

Solution treatment or annealing can be done by rapid cooling after heating to 1010-1120°C.

Machinability

[Stainless steel 304](#) has good machinability. Machining can be enhanced by using the following rules:

- Cutting edges must be kept sharp. Dull edges cause excess work hardening.
- Cuts should be light but deep enough to prevent work hardening by riding on the surface of the material.
- Chip breakers should be employed to assist in ensuring swarf remains clear of the work
- Low thermal conductivity of austenitic alloys results in heat concentrating at the cutting edges. This means coolants and lubricants are necessary and must be used in large quantities.

Welding of Stainless Steel 304

Fusion welding performance for [Stainless steel 304](#) is excellent both with and without fillers. Recommended filler rods and electrodes for stainless steel 304 is grade 308 [stainless steel](#). For 304L the recommended filler is 308L. Heavy welded sections may require post-weld annealing. This step is not required for 304L. Grade 321 may be used if post-weld heat treatment is not possible.

Applications of Stainless Steel 304

[Stainless steel 304](#) is typically used in:

- Sinks and splashbacks
- Saucepans
- Cutlery and flatware
- Architectural panelling
- Sanitaryware and troughs
- Tubing
- Brewery, dairy, food and pharmaceutical production equipment
- Springs, nuts, bolts and screws

Supplied Forms

[Stainless steel 304](#) is typically supplied by [Aalco](#) in a range of finishes in the following forms:

- Sheet
- Strip
- Tube
- Quarto plate
- Bar
- Fittings & Flanges
- Pipe
- Plate

Source: Aalco

For more information on this source please visit [Aalco](#)

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